instruction manual

T.G. LAB
G QUIRK

IMPORTANT—The user wants to read this manual before starting work. Please make sure he gets it.

A.C. VOLTAGE STABILISER
type AC.2 Mk.III

Servomex Controls Limited
Crowborough Sussex Crowborough 1247

A C VOLTAGE STABILISER
Type AC 2 Mk III

Servomex Controls Ltd.,
Crowborough, Sussex.

Telephone: Crowborough 1247.

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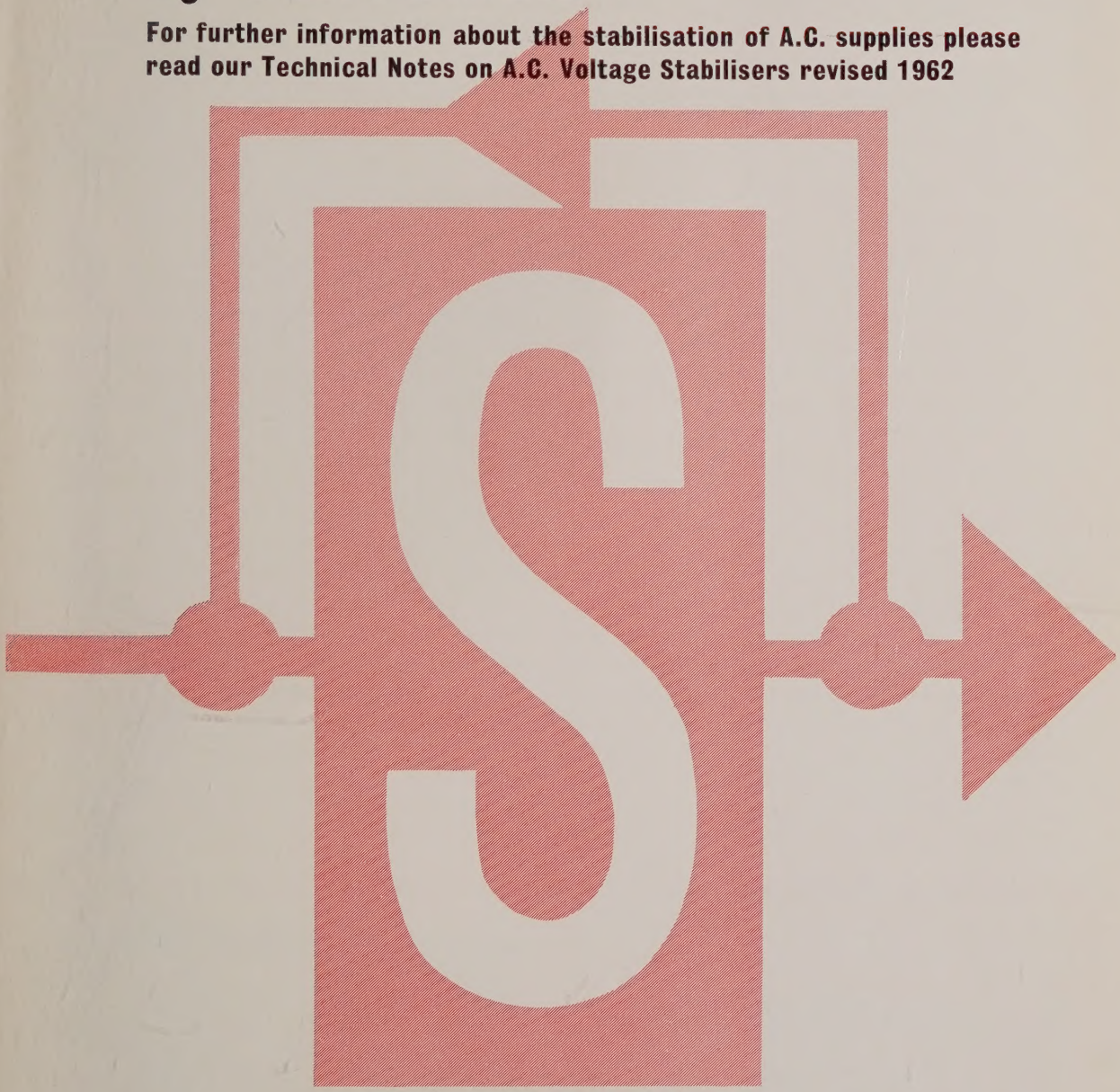
A.C. VOLTAGE STABILISERS

Types AC.2 Mk III and AC.7 Mk II

by SERVOMEX

For further information about the stabilisation of A.C. supplies please read our Technical Notes on A.C. Voltage Stabilisers revised 1962



Servomex Controls Ltd., Crowborough, Sussex—Crowborough 1247

Printed in England, February 1963.

General

The two instruments described on this data sheet are direct replacements for the previous AC.2 Mk. IIB and the AC.7. They are interchangeable with the old models. There are several important improvements in performance and in convenience of use:—

(a) The precision has been improved to a nominal 0.1%.

(b) The speed has been raised about 4:1.

(c) Accessibility is improved, particularly the input/output connections.

(d) We have changed to a greatly improved servo motor giving even more silent working.

(e) Wide range/narrow range facility provides increased output if required.

Several thousand of the earlier models are now in use in industry, in Government laboratories, and in military installations all over the world. As before, the latest models use components of the highest quality, nearly all taken from the current inter-Services approved list.

Range of Correction

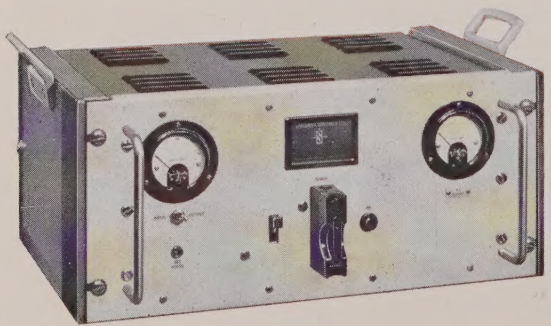
The range of correction is the range of input voltage for which the output voltage is held constant. This is set out in the table at the end of this specification. It must be realised that the main purpose of the instrument is to provide a highly stable output voltage *at the nominal voltage of the supply*. It is not normally sensible to use a stabiliser of this type to provide, say, a stabilised output voltage of 240 volts when the nominal value of the supply is, say, 220. That can be done under certain circumstances, but requires a little thought to ensure that a reasonable range of correction is still available.

Both models are suitable for supplies anywhere in the range 200 to 250 volts. As an example, the table shows that the larger model has a total range of correction of 30% on the wide range connection; if the output is set to 220 volts the input can vary over a total range of 66 volts which may be 176 to 242 or it may be 187 to 253. On the narrow range this model gives a total range of correction of 15%, i.e. 33 volts for a 220 volt output.

To use these stabilisers as a variable voltage supply is often convenient, and can be done provided one understands the limitation of the range just mentioned. For example, using the AC.7 Mk. II on wide range, and supposing the input voltage to be 250 volts at the moment, it will be possible to have output voltages from 250 volts down to 217.4 volts. To run the stabiliser at, say 200 volts when the input is 250 will require an auto transformer on the input side. If the nominal value of the supply is 250 and it is required to run the stabiliser output at 200 volts, *with the range of correction given in the table,* then the auto transformer would have to step down the input in a ratio 250:200. A further point about the use of the instrument as a variable voltage supply is that the valve heaters will have the wrong voltage unless the transformer tap at the back of the instrument is properly set to the output voltage. In the case just mentioned, it is necessary to set the voltage selector to 200 volts even though the supply voltage is 250.

These points are dealt with at some length because users have too often overlooked them.

To prevent unintentional change of output voltage, the voltage control is operated by a screwdriver, from the front.



Voltage Stabiliser AC.2 Mark III.

Voltage Stabiliser AC.7 Mark II.

Current Rating

The rating is shown in the table. This rating applies at normal room temperatures up to 25°C.; in ambient temperatures of 55°C. the continuous rating is reduced to 50%. The instruments are not intended for *use* above 55°C.

Stability of Output Voltage

The nominal stability is ±0.1% (steady-state), that is to say, in ordinary use, with the input varying over the whole of its correction range, and from 45 to 65 c/s, and with any waveform from sine wave to square wave, the steady-state R.M.S. value of the output voltage will not vary by more than ±0.1%. Please observe that to check the performance of these stabilisers requires measuring equipment of a quality rarely found outside the national standardising laboratories. Against changes of frequency, temperature, waveform, and magnetic field, these stabilisers are considerably superior even to most "substandard" dynamometer voltmeters.

The effect of temperature

The measuring circuit is only slightly temperature-sensitive and the residual error is very successfully compensated in these new models, so that changes of 40°C. will often not take the output voltage beyond the nominal ±0.1% limit. Nevertheless, there are transient disturbances while the temperature distribution is changing, and over the range 0-50°C. it may be possible to induce changes of the order of one volt.

The effect of load currents, power factor, and non-linear loads

No steady load will change the output voltage by more than ±0.1%. The stabiliser is unaffected by rectifier loads or by changes in power factor from resistive to pure reactive including capacitive loads.

Speed of response

The speed of correction for large errors is given in the table. While this "volts per second" speed has been made much of for advertising purposes, it has to be said that it is not a very good measure of the quality of a stabiliser. The AC.2 Mk. III on wide range runs at nearly 70 v/s when the supply is suddenly switched from 190 to 230 volts. One might conclude that errors of 7 volts will be corrected in 0.1 seconds and errors of 2 volts in not much more than 1 cycle—nothing could be further from the truth, whether with the Servomex stabilisers or those of our competitors. Errors of 40 volts require about 1 second for full correction. For steps of 10 volts OR LESS, the time for total correction is 0.6 seconds. Notice that this is not the "time constant": the effective time constant is about 0.2 seconds, because about three "time constants" are required for correction.

On narrow range the response time is longer, but not twice as long.

Distortion

These stabilisers do not introduce any measurable distortion into the wave form. The distortion at the output terminals is the same as the distortion at the input terminals within ordinary limits of measurement. Tests indicate considerably less than 0.05% total harmonic distortion introduced by the stabiliser.

Method of Working, and Circuit Description

A variable transformer is used to supply a buck or boost voltage as may be necessary to correct the input to the required value. This variable transformer is driven by a two-phase servo motor with enclosed gearing and torque limiting device. Variations of the output voltage are detected by a bolometer bridge, the output of which is amplified in a two valve servo amplifier and applied to the motor. A properly designed tachometer generator provides stabilising velocity feedback to make the instrument completely independent of friction. The instrument uses no relays, thyratrons, or electrolytic capacitors.

In the development of these new models we naturally considered very seriously the undoubted "selling point" of being able to use the magic word "transistorised". We developed several satisfactory transistor amplifiers, but after prolonged testing and consultation with users we concluded that the balance of long term reliability lay with the valve circuit. The comparison is between two valves and no electrolytic capacitors on the one hand, against a larger number of transistors and a number of electrolytic capacitors on the other hand. Many years' experience with our previous models has shown that the two valve amplifier can be

expected to run continuously for forty thousand hours or more without having to change the valves. That is because they are incorporated in a feed-back arrangement and heavily underrun.

Construction and Workmanship

The instruments are designed for mounting in a standard 19 inch rack. Details of panel size are given below. For ordinary laboratory use the wooden ends are required to prevent damage and provide a convenient carrying handle.

Metal parts are finished to current inter-Service specifications. The front panel is painted *light grey* (British Standard Tint No. 631).

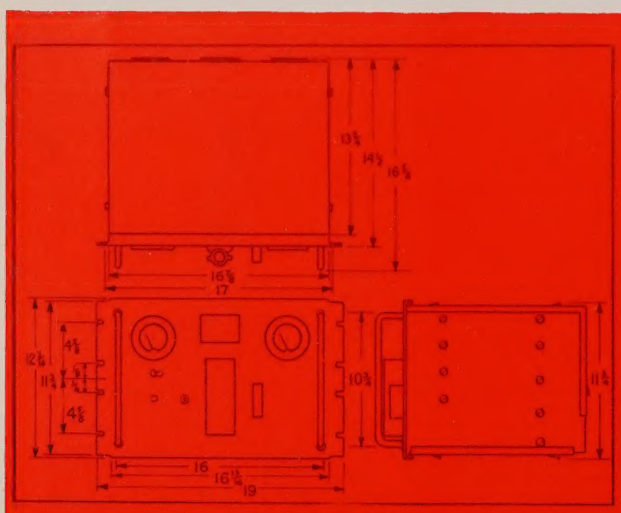
The instrument is tropically finished and suitable for indoor service in any part of the world.

The construction is immensely strong and the instrument can withstand impacts of up to 40 g in any direction. It can even be used in a vehicle driven over rough terrain, with no loss of accuracy.

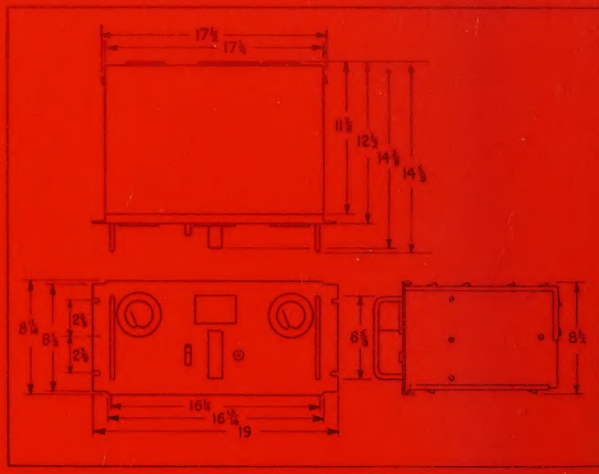
Meters and controls Moving iron meters are provided to read voltage (input and output) and load current. The AC.2 Mk. III has an on/off switch and a 13 amp. socket outlet at the rear as well as the main screw terminals. The AC.7 Mk. II has neither switch nor socket outlet, as this model is normally wired permanently into circuit, with external switchboard. Both models have a re-wireable fuse.

Guarantee Departures from the specification during the first two years of proper use will be corrected free of charge.

Nominal supply volts	Correction range on nominal	Accuracy (r.m.s.)	Approximate Correction rate v/sec.	Output current amps.	Net Weight Rackmount'g	Weight packed for export	Dimensions of Export packing case	When fitted with wooden ends weight is increased by
AC.2 Mk. III Wide range 200/250 2 KVA. or	−17·5% to +8·5% or −13% to +13%	±0·1%	60	9	68 lbs. (30·9 kg.)	147 lbs. (66·7 kg.)	29½ x 19½ x 24½ inches	6 lbs. (2·7 kg.)
Narrow range 200/250 4 KVA.	−8·5% to +4·5% or −6·5% to +6·5%	±0·1%	30	20			75 x 49·5 x 62 cms.	
AC.7 Mk. II Wide range 200/250 7 KVA. or	−20% to +10% or −15% to +15%	±0·1%	45	30	146 lbs. (66·3 kg.)	276 lbs. (125 kg.)	31 x 26 x 30 inches	13 lbs. (5·9 kg.)
Narrow range 200/250 14 KVA.	−10% to +5% or −7·5% to +7·5%	±0·1%	22	60			79 x 66 x 76 cms.	



Outline details AC.7 Mark II.



Outline details AC.2 Mark III.

Section II INITIAL STARTUP AND OPERATION.

STARTUP.

This instrument is suitable for operation on a.c. supply mains between 200 and 250 volts at 45 - 65 c/s. It will hold its output terminal voltage constant to around 0.1% of the true r.m.s. value, irrespective of 0 - 100% load changes and an overall input variation of 26.25% (wide range) or 13% (narrow range). It will handle up to 9 amperes on wide range or 20 amperes on narrow range.

ON RECEIPT OF THE INSTRUMENT, THOROUGHLY INSPECT FOR SIGNS OF VISIBLE DAMAGE SUSTAINED WHILE IN TRANSIT AND, IF THERE ARE ANY, REPORT IMMEDIATELY ON THE REPLY PAID CARD AT THE END OF THIS MANUAL.

If all is in order, set the voltage selector at the rear of the instrument to the nominal value of the supply mains.

Connect the input and output LIVE leads at the terminal panel; connect the NEUTRAL and EARTH leads.

The instrument will be sent out connected for WIDE range operation with a double metal link connecting terminals 2 and 3 on the panel. If you want NARROW range remove the links connecting 2 and 3 and regroup as follows: 1 - 2 and 3 - 4.

The correction range is set at our works for correcting supply variations of + 8.75% and - 17.5%. If you require a symmetrical correction of ± 13% transfer the connection from terminal Z on the variable transformer to terminal L.

Check that the main fuse carries the correct rating of wire (fusing current 15 amperes on the 9 ampere range fitted on leaving our works). (For wire sizes see Section IV).

Switch on the supply. Check the input and output voltage on the panel voltmeter. The input voltage should be within the correction range of the nominal value set on the voltage selector. Adjust the output voltage to the nominal value by means of the preset control directly beneath the voltmeter. The instrument is now ready for use.

OPERATION NOTES.

Measuring the output voltage. The instrument measures and corrects the true r.m.s. value of the output voltage. Our panel voltmeter is a moving iron instrument and reads r.m.s. irrespective of the supply waveform. When checking the output voltage by other means NOTE: most testmeters and recorders read the average value of the supply. Average and r.m.s. values are only identical on pure sine-waves and vary drastically with changes in waveform. Therefore only an r.m.s. reading device will give the correct answer.

Voltage on switching on. When the stabiliser is switched off it retains the amount of 'buck' or 'boost' required by the input voltage at the instant of switching off. It is still in this situation on switching on though the input voltage may be considerably changed. It requires a little over 5 seconds for the stabiliser to become 'live' and make the correction. If your apparatus can be upset during this indeterminate period, make allowances for 'warming up' before applying your load.

Obtaining output voltages other than the nominal value.

(a) Small changes of up to ± 5 volts may be set by adjustment of the preset panel control.

(b) Larger changes require the repositioning of the voltage selector at the rear of the instrument.
EXAMPLE - If your supply is 220 volts and you require stabilised output at 240 volts then the output voltage selector must be set to 240. In this condition the instrument will accept + 8.75% and - 17.5% of 240 volts as an input variation, i.e. 260 down to 198 volts. Your 220 volts supply can vary between these limits and maintain a 240 volt output from the stabiliser.

Variations outside the correction range. If the supply varies outside the correction range, the instrument still works but the output changes by the amount exceeding the limit.
EXAMPLE. On a nominal 240 volt setting, the lower limit is 198 volts (-17.5%). When input falls to 188 volts (198 - 10) the output falls by the same amount (240 - 10) i.e. 230 volts.
Although this is not a desirable state of affairs, the stabiliser will suffer no damage (electrical or mechanical).

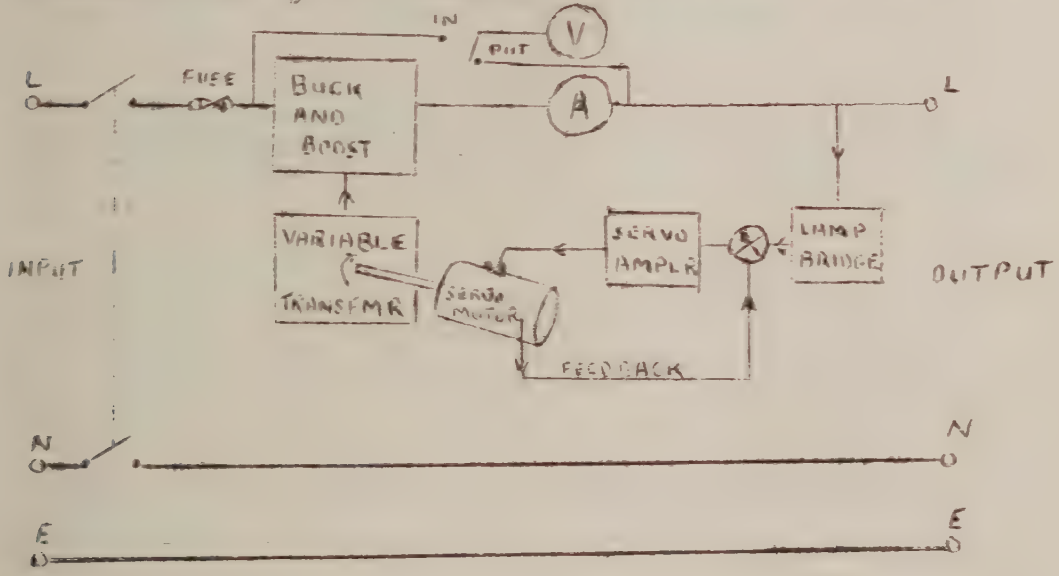
WARNING. THE INSTRUMENT WILL BE SEVERELY DAMAGED IF THE BRUSH OF THE VARIABLE TRANSFORMER TRACK IS ALLOWED TO WEAR OUT. MAKE SURE YOU READ THE MAINTENANCE INSTRUCTIONS.

Section III

EXPLANATION OF PRINCIPLES AND OPERATION OF CIRCUIT.

Our system is an electromechanical one as shown in the simplified block diagram.

A bolometer bridge, coupled to the output through a potential transformer, detects changes in the output level. The bridge output feeds the servo amplifier which in turn drives the two-phase servo motor. This is coupled through gearing to the tap on the variable transformer. The variable transformer feeds the primary of the buck and boost transformer which adds or subtracts from the supply potential to keep the bridge in balance. A tacho-generator which is an integral part of the motor, provides a stabilising feedback signal. This is adjusted to give good damping.



For detailed explanation of the circuit, refer to the following paragraphs and the circuit diagram, drawing B.63/1 supplied with this manual.

The transformer T.1 is coupled directly to the stabiliser output and provides H.T. and heater power for the two valve servo amplifier. The H.T. supply (approx 280 volts) comes from winding A.B. C.11.R.33 are for surge limiting. Following the bridge rectifier, C.1 acts as a reservoir.

OPERATION OF THE CIRCUIT (Cont'd.)

T1 - winding G. 1 - 5 supplies 12 - 13 volts at 0.4 amps to the bolometer bridge. This carries 2 resistive arms and two lamp arms - each with 2 lamp elements (LP1 - LP4).

The resistance of the lamps varies with temperature and is only in balance for one value of applied voltage. The temperature is proportional to V^2 so that the bridge is sensitive to small changes in voltage. To compensate for the temperature coefficient of the transformer windings the winding F.E forms part of the bridge. This is purely resistive and varies with the transformer temperature.

The bridge output - approx 8 millivolts per 0.25% change goes through the low pass filter R5.C3.R6.C4. This attenuates the 3rd harmonic components of supply frequency generated in the bridge which would otherwise reduce the sensitivity of the circuit.

V.1 is a two stage triode amplifier with R.C. coupling to V.2. V.2 is a cathode coupled pentode pair in which measures are taken to get equal drive from both anodes to feed T.2. The capacitor on the primary side of T.2 affords some power factor correction to an otherwise inductive load.

The geared motor unit is manufactured by Servomex and is basically a two phase squirrel cage induction motor. The reference phase 6.3 volts comes from winding C.D on T.1 while the servo amplifier output drives the control phase, via T.2. The output shaft speed is 60 r.p.m. and the tacho-generator develops 48 millivolts per r.p.m.

The generator output provides a damping signal which appears at V.1 grid via R.8 where its value has been adjusted to get the best operating conditions.

The motor drives the brush on the variable transformer T.4 in the direction determined by the phase of the bridge unbalance. This component supplies the input to the buck and boost transformer T.3 and aids or opposes the supply potential to keep the output constant.

Section IV. MAINTENANCE INSTRUCTIONS.

Variable transformer Brush and Track. This component is the only one which requires regular routine maintenance. If the brush wears down too far, poor contact with the track will produce sparking and ruin the transformer winding in a very short time.

Examine the brush and clean the track every ~~1000 hours~~ 6 month of running. Clean any blackened patches from the track with a piece of rag and apply the thinnest film of petroleum jelly, to reduce copper oxidation. The carbon portion of the brush projects 0.125 inches when new and must be replaced when reduced to half this length. One new brush is supplied with each instrument and stocks are always available for immediate despatch from Servomex.

Providing the track is kept clean the life of the transformer is virtually unlimited and the brush should last at least 5000 hours of continuous use.

General lubrication. Only under exceptional circumstances will it be necessary to lubricate the mechanical parts. The geared motor unit contains oil loaded bushes. The variable transformer is lubricated with AEROSHELL II Spec DTD.825A or NG.275. Amounts sufficient for the normal lifetime are included on initial assembly.

Valves. Valves are run under very favourable conditions well below their normal rating. Only under exceptional circumstances will they need replacement within 10000 hours of normal running and will probably last several times this period.

Bridge Lamps. These are normal 6.3 volts 0.3 amps metal filament lamps. They are run at about half their normal voltage rating and should last indefinitely. In the unlikely event of replacement, they will require 72 hours running to stabilise completely though there should be very little variation in characteristics after the first 2 to 3 hours. In the event of lamp failure, the stabiliser output voltage automatically falls to the lowest level.

Driving Chain. This will last indefinitely, but if spares are needed they may be obtained directly from Servomex.

The chain may be opened by sliding off the locking plate on the spring link.

Fuses.

Main fuse wire - Wide Range Connection - 27 British Standard Wire Gauge .0164 ins. dia (.0415 mm)

" " " Narrow Range Connection - .028" dia (.071 mm)

Variable Transformer fuse. 3 amp cartridge to British Standard specification 646 (B).

MAINTENANCE INSTRUCTIONS.(Cont'd.)

Fault Finding. In the event of having to find a fault in the equipment, the following information may be useful. The voltages must be read on a high resistance voltmeter (Avo Model 8 or equivalent).

Typical Figures.

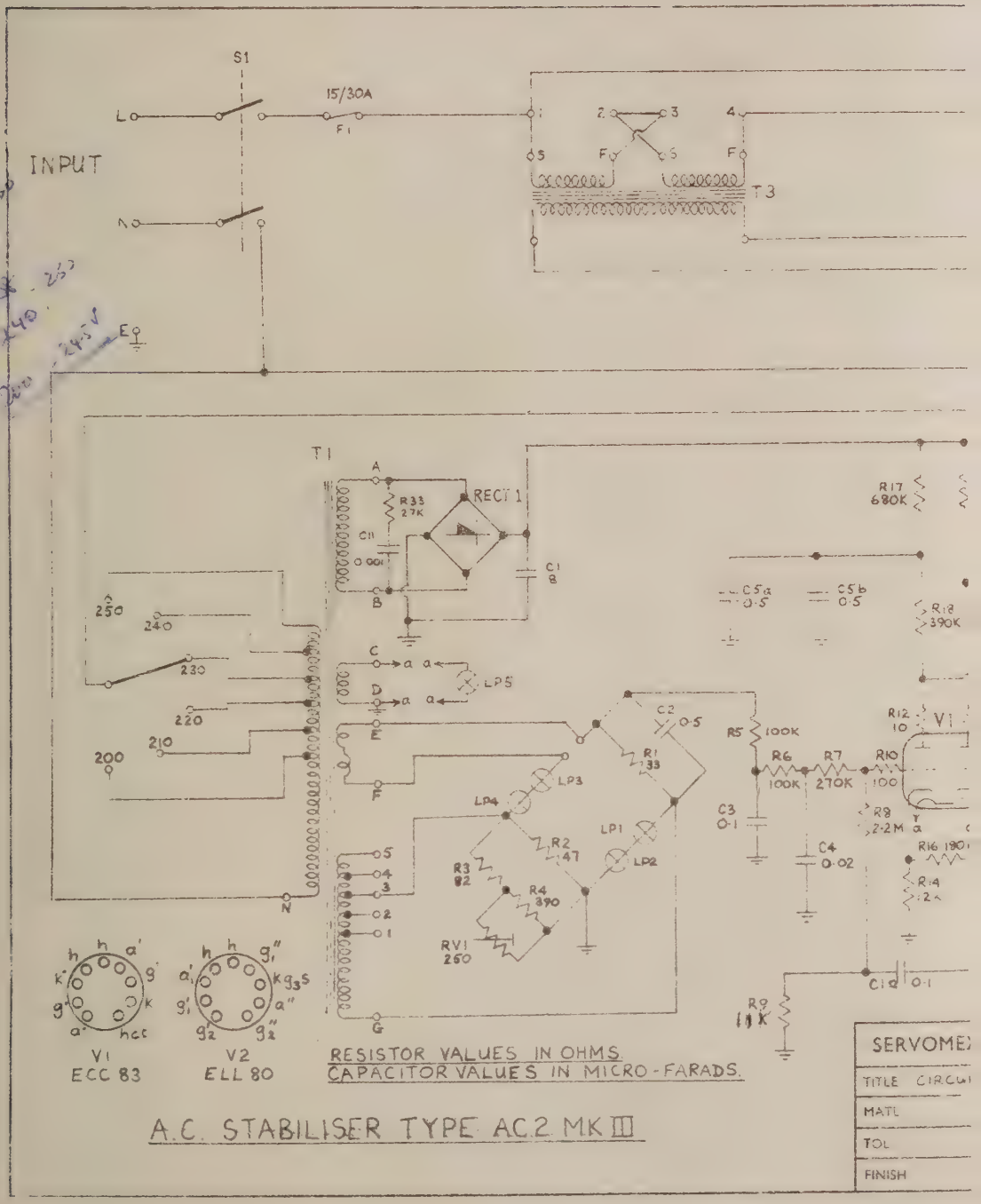
Primary current in Transformer T.1. 170 milliamps.
H.T. volts 280. H.T. Current. 40 milliamps.

V.1	Pin 1	130 volts		V2	Pin 3	274 volts
	" 6	145 "			" 8	274 "
	" 3	1.6 "			" 7	22 "
	" 8	1.7 "				

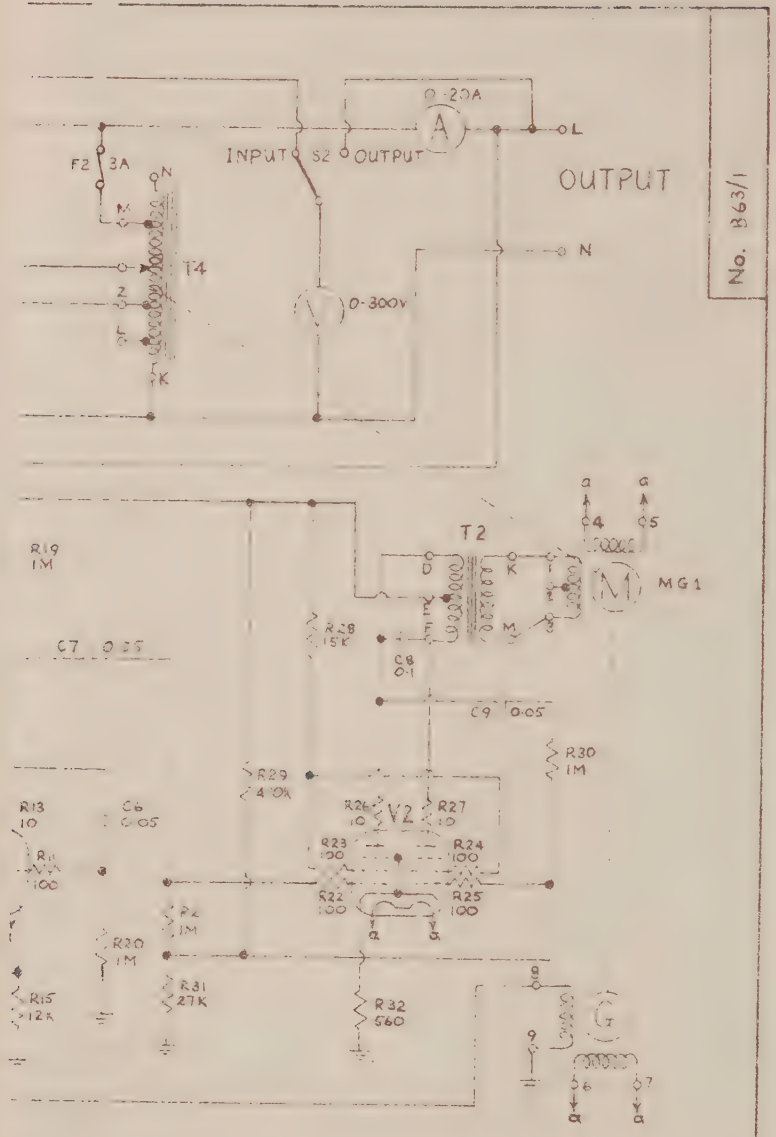
D.C. Resistances of Motor Windings.

1 to 3 - 22 ohms. 4 to 5 - 2 ohms.
6 to 7 - 19 ohms. 8 to 9 - 200 ohms.

To check that the servo is operating, short circuit resistance R.9 and this should produce mechanical oscillation of the system at about 1.5 c/s. This action removes the damping feedback signal and permits oscillation at the natural frequency. A small push may be needed to start the motion.
R.9 is identified with a red paintspot on the tagboard close to the end connection.



C10	Capacitor, 0.1 μF, 20%, 1000V, RCSC type CPM2-G	2743-002
C11	Capacitor, 0.001 μF, 20%, 1,000V, RCSC type CP31-F	2741-



CONTROLS LTD.	No. B63/1	DATE	MODIFICATION	SIG.
T DIAGRAM	JOB No. 63			
	PROJECTION			
	OFF PER UNIT			
	SCALE / DATE 25-6-62			
		DRAWN BY		

Component Ref.	Description	Part No.
R1	Resistor, ww, 6W, 33Ω 5%, RCSC type RWV4-L	2662-
R2	Resistor, ww, 6W, 47Ω 5%, RCSC type RWV4-L	2662-041
R3	Resistor, ww, 6W, 82Ω 5%, RCSC type RWV4-L	2662-
R4	Resistor, ww, 1.5W, 390Ω, 5% RCSC type RWV3-J	2661-
R5	Resistor, Grade 2, Ins, 1/4W, 100 k 10%, RCSC type RC7-J	2642-321
R6	Resistor, Grade 2, Ins, 1/4W, 100 k 10%, RCSC type RC7-J	2642-321
R7	Resistor, Grade 2, Ins, 1/4W, 270 k 10%, RCSC type RC7-J	2642-331
R8	Resistor, Grade 2, Ins, 1/4W, 2.2 M 10%, RCSC type RC7-J	2642-353
R9	Resistor, Grade 1, NI. 1/4W, 11 k 1%, RCSC type RC2-E	2611-099
R10	Resistor, Grade 2, Ins, 1/4W, 100 Ω 10%, RCSC type RC7-J	2642-249
R11	Resistor, Grade 2, Ins, 1/4W, 100 Ω 10%, RCSC type RC7-J	2642-249
R12	Resistor, Grade 2, Ins, 1/4W, 10 Ω 10%, RCSC type RC7-J	2642-225
R13	Resistor, Grade 2, Ins, 1/4W, 10 Ω 10%, RCSC type RC7-J	2642-225
R14	Resistor, Grade 1, NI. 1/4W, 12 k 5%, RCSC type RC2-E	2611-099
R15	Resistor, Grade 1, NI. 1/4W, 12 k 5%, RCSC type RC2-E	2611-099
R16	Resistor, Grade 1, NI. 1/2W, 180 k 5%, RCSC type RC2-D	2611-327
R17	Resistor, Grade 2, Ins, 1/4W, 680 k 10%, RCSC type RC7-J	2642-341
R18	Resistor, Grade 2, Ins. 1/4W, 390 k 10%, RCSC type RC7-J	2642-335
R19	Resistor, Grade 2, Ins. 1/4W, 1 M 10%, RCSC type RC7-J	2642-345
R20	Resistor, Grade 2, Ins. 1/4W, 1 M 10%, RCSC type RC7-J	2642-345
R21	Resistor, Grade 2, Ins. 1/4W. 1 M 10%, RCSC type RC7-J	2642-345
R22	Resistor, Grade 2, Ins. 1/4W, 100 Ω 10%, RCSC type RC7-J	2642-249
R23	Resistor, Grade 2, Ins, 1/4W, 100 Ω 10%, RCSC type RC7-J	2642-249
R24	Resistor, Grade 2, Ins. 1/4W, 100 Ω 10%, RCSC type RC7-J	2642-249
R25	Resistor, Grade 2, Ins. 1/4W, 100 Ω 10%, RCSC type RC7-J	2642-249
R26	Resistor, Grade 2, Ins. 1/4W, 10 Ω 10%, RCSC type RC7-J	2642-225
R27	Resistor, Grade 2, Ins. 1/4W, 10 Ω 10%, RCSC type RC7-J	2642-225
R28	Resistor, WW, 6 W, 15 k 5%, RCSC type RWV4-L	2662-101
R29	Resistor, Grade 1, NI. 1 W, 470 k 5%, RCSC type RC2-B	2611-737
R30	Resistor, Grade 1, NI. 1 W, 1 MΩ 5%, RCSC type RC2-B	2611-745
R31	Resistor, Grade 1, NI. 1/4W, 27 k 5%, RCSC type RC2-E	2611-107
R32	Resistor, WW, 6W, 560 Ω 5%, RCSC type RWV4-L	2662-
R33	Resistor, Grade 2, Ins. 1/4W, 27kΩ 10%, RCSC type RC7-J	2642-
C1	Capacitor, 8 µF, 20%, 600V, RCSC type CP10-N	2741-540
C2	Capacitor, 0.5 µF, 20%, 500V, RCSC type CP31-P	2741-095
C3	Capacitor, 0.1 µF, 25%, 150V, RCSC type CPM2-G	2743-002
C4	Capacitor, 0.02 µF, 20%, 500V, RCSC type CP31-H	2741-083
C5a	Capacitor, 0.5 µF, 20%, 500V, RCSC type CP31-P	2741-095
C5b	Capacitor, 0.5 µF, 20%, 500V, RCSC type CP31-P	2741-095
C6	Capacitor, 0.05 µF, 20%, 500V, RCSC type CP31-K	2741-087
C7	Capacitor, 0.05 µF, 20%, 500V, RCSC type CP31-K	2741-087
C8	Capacitor, 0.1 µF, 5%, 600V ac. Dub: type 470V.	2741-
C9	Capacitor, 0.05 µF, 20%, 500V, RCSC type CP31-K	2741-087
C10	Capacitor, 0.1 µF, 25%, 150V, RCSC type CPM2-G	2743-002
C11	Capacitor, 0.001 µF, 20%, 1,000V, RCSC type CP31-F	2741-

Component Ref.	Description	Part No.
RECT.1.	Single phase bridge stack, G.E.C. type Sx 638 B1P1	2863-
T1	Transformer drawing No. C6/174	-
T2	Transformer drawing No. C6/170	-
T3	Transformer drawing No. C6/175	
T4	Transformer Philips Variable 2P246/73	
LP1) LP2) LP3) LP4)	Lamps, filament, 6.5V, 0.3A, 11mm dia. bulb, M.E.S.	2552
LP5	Lamp, filament, 12V, 0.3A, 11 mm dia bulb, M.E.S.	2552-
RV1	Pot, WW, 1W, 250 Ω, 10%, CLR/4201/11S.	2724-
V1	Valve CV 492 Mullard type ECC 83	2843-431
V2	Valve CV Brimar type ELL 80	2845-
F1	9A Range fit, 27 S.W.G. tinned copper wire 20A " " , 22 S.W.G. " " "	
F2	Fuse, cartridge to BS 646 (B) 3A	2531-041

GUARANTEE

Under the unique Servomex guarantee any departures from specification during the first twelve months of proper use will be corrected free of charge.

This equipment—Serial No.....

was put into service on—Date.....

In the event of failure or query please communicate with :—

The Chief Sales Engineer,
Technical Sales Dept.,
Servomex Controls Ltd.,
Crowborough, Sussex. **Crowborough 1247.**

The equipment covered by this guarantee is now in your possession and should give you years of satisfactory service.

If you would be kind enough to complete and return the prepaid reply card to us, it would assist us in improving our customer service facilities.

EQUIPMENT SERIAL NO.

We would like to receive information concerning maintenance and service as and when published.

DATE

The correct postal address of the Dept. / person responsible for the care of the equipment is :—

If there is damage or discrepancy on receipt, please indicate below and return card immediately.

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